

THE FACTORY AUTOMATION COMPANY

FANUC

Integrated Laser System

CO₂

Product overview



All made by FANUC

Between 80% and 90% of all FANUC components are fully developed, manufactured and tested to perfection in-house in Japan. We provide the muscles and the brain – motors, amplifiers, software, operating system, controllers and final product composition are made by FANUC.

Remaining independent of external suppliers, means we can guarantee complete component traceability and take total responsibility for our products.

The result? Products that provide our customers with the highest uptime and reliability in the automation industry.

No. 1 in the world

FANUC is the leading global manufacturer of factory automation, with more than 60 years experience in the development of computer numerical control equipment.



Integrated laser systems – unique FANUC package solution

Take advantage of the market leader's expertise in high-quality laser applications with FANUC's completely integrated solution: Specifically designed CO₂ laser sources from 1 to 6 kW, CNC control with integrated laser control functions for 2-D and 3-D laser cutting machines, CNCs to control combined punching and laser cutting machines, and high-performance servo drive systems – all together in an optimised interfaced laser package. FANUC's laser applications provide industry leading performance and reliability in the dusty, high-vibration environment of even the most challenging fabricating shops.

One supplier – one contact for laser source, CNC and servo drives.

Your advantages:

- one stop for laser sources, CNC and drives
- full application support
- fast and efficient start-up
- easy operation, monitoring and maintenance
- maximum versatility and reliability
- low energy consumption
- perfect cut-edge quality from thin to thick materials
- fly cutting with real-time power control
- dedicated CNC functions for laser
- high productivity



FANUC CO₂ Laser

FANUC CO₂ Laser represents a reliable, precise and cost-effective way to cut sheet metal. Producing smooth cutting edge surfaces, it delivers superior parts fitting regardless of material thickness. Featuring plug and play compatibility, the technology is fully integrated into a single space-saving cabinet.



FANUC C series

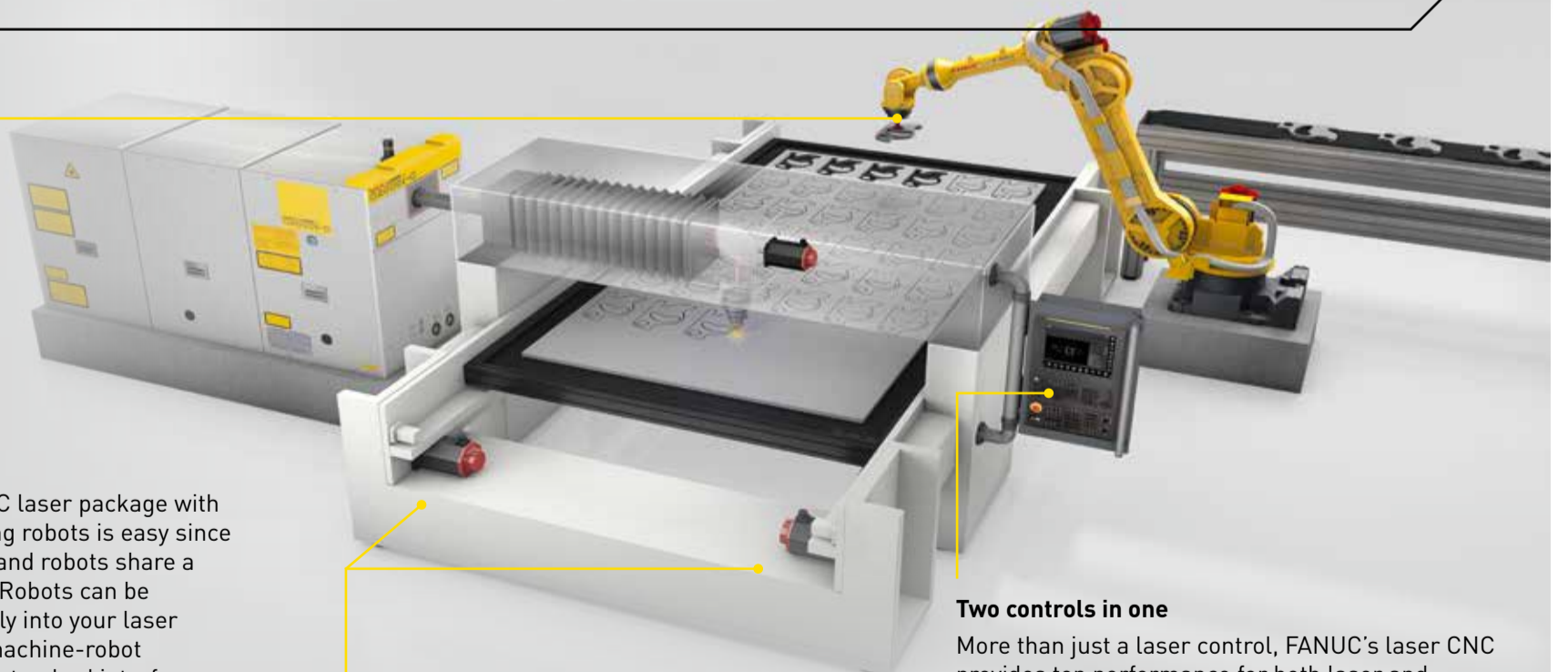
CO₂ laser line up 1 to 6 kW

Your advantages:

- tailored beam quality
- maximum versatility – wide range of uses
- laser cutting and combined laser/punching
- low energy and gas consumption
- for mild steel up to 32 mm plus
- stainless steel cutting free from oxidation up to 20 mm plus
- for alternating thin to very thick sheets
- smoothest cutting edge guaranteed
- fast axial flow technology
- high speed GAS flow by Turbo Blower (own designed FANUC direct motor technology, reliable)
- high efficiency approx. 11~13% (proven by real usage)
- PSU using semiconductor/FET switching
- RF excitation method 2MHz (safe switching)
- dust Collector (Patented)
- oil mist decomposition element (Patented)
- nano-stage mirror mount surface (reliability, stability)
- output command analogue resolution 125 [usec] (fast)
- direct pulse modulation on time 20 [usec], its delay < 10 [usec] (less delay)

Helping you choose the perfect laser source

Just tell us what you want to cut, and we will help you find the best solution for you. We will also provide you with cutting parameters for a broad range of materials. What's more, we will help you integrate your laser into your machine, offering you both the know-how and the tools to create the ultimate setup.



Handling made easy

Supplementing your FANUC laser package with FANUC high-speed handling robots is easy since all FANUC's CNC systems and robots share a common control platform. Robots can be integrated quickly and easily into your laser machine processes, with machine-robot connectivity achieved via a standard interface. The CNC's integrated screens monitor and control the robot and vice versa – something that can be further enhanced with FANUC handling solutions equipped with visual detection to make your machine more productive. Just ask – we love coming up with solutions.

High-performance FANUC drive systems

Offering a wide range of servo, linear and dedicated motors for each laser application, FANUC provides everything you will ever need for CO₂ laser. All FANUC drive systems are engineered to provide the highest performance at the lowest possible rates of energy use.

Two controls in one

More than just a laser control, FANUC's laser CNC provides top performance for both laser and machine tools. Featuring pre-installed interfaces, the control's intelligent software not only enables highly efficient laser processing, but also the deployment of components from FANUC standard CNC technologies and CNC accessories. FANUC Serial Servo Bus (FSSB) enables powerful fly-cutting operation and real-time control of laser power and axis speed.

FANUC CO₂ Laser Systems - 5 strong models up 1 kW to 6 kW

FANUC laser C1000i-C



FANUC laser C2000i-C



FANUC laser C3000i-C



FANUC laser C4000i-C



FANUC laser C6000i-C



Low cost for thin sheet and non-metal quality cutting

- cutting of mild steel up to 10 mm thickness
- replacing water-jet and plasma cutting machines
- cutting of wood or plastics
- smallest weight and volume of its class
- best cost/cutting performance ratio

Entry level with 2.5 kW for standard laser cutting machines

- cutting of mild steel up to 22 mm thickness
- cutting of stainless steel up to 12 mm thickness
- cutting of aluminium
- cost effective solution to compete with 3 kW laser cutting machines

Achieve best cutting edge qualities

- high performance in cutting edge quality in thin metal and thick metal
- excellent capability to cut the thinner sheet metal with superior beam quality
- fly cutting with real-time power control

High performance machines for a large range of applications

- cutting of mild steel up to 28 mm thickness
- cutting of stainless steel up to 15 mm thickness
- highest cutting quality and speed
- highest range of materials and applications
- extremely low gas and electrical power consumption

Highest power for the widest range of applications

- cutting of mild steel up to 32 mm thickness
- cutting of stainless steel up to 20 mm thickness
- ideal for high performance thick plate cutting applications
- enormous laser peak power (7kW), easy handling
- wide range of applications from surface treatment and welding to cutting from thin to thick material



		C1000i-C		C2000i-C		C3000i-C		C4000i-C		C6000i-C	
Optical path length				Short	Long	Short	Long	Short	Long		
System principle		RF discharge excitation fast axial gas flow									
Structure		Integrated type ¹⁾ (oscillator and power supply)									
Laser rated output (W)		1000		2000		3000		4000		6000	
Laser maximum output (W)		1000		2500		3000		4000		6000	
Pulse peak power (W)		1000		2700 ²⁾		3200 ²⁾		4000		7000 ²⁾	
Output stability		± 1% ³⁾				± 2% ³⁾					
Laser wavelength		10.6 μm									
Beam mode		Low order mode									
Beam diameter at exit (mm)		< ø 20		< ø 27	< ø 24	< ø 22	< ø 19	< ø 27	< ø 24	< ø 28	
Polarization		45° linear				circular	90° linear	circular	90° linear		
Beam divergence angle (full angle)		2mrad or less									
Pulse frequency		5 to 5,000 Hz		5 to 32,767 Hz		5 to 10,000 Hz		5 to 32,767 Hz			
Pulse duty		0 to 100%									
Laser gas ⁴⁾		Gas A			Gas B						
Gas consumption rate (l/h)		Approx. 10									Approx. 20
Cooling water	Water rate (l/min.)	40		75		120		160		250	
	Circulated water pressure	0.5MPa or less gauge pressure									
	Water temperature / Water temperature stability	20 to 30°C / ± 1°C				20 to 30°C / ± 2°C					
	Recommended cooling capacity (kW)	11		22		33		44		66	
Input power supply		AC200V + 10%, -15% 50/60Hz ± 1Hz or AC220V + 10%, -15% 60Hz ± 1Hz or AC230V + 5%, -10% 60Hz ± 1Hz									
Power supply capacity (kVA)		18		33		44		55		75	
Mass (kg)		350 30 (pump)		700		750		900		1300	

¹⁾ In C1000i-C, the vacuum pump is placed outside of the main unit

²⁾ Within limited pulse duty

³⁾ At rated power with laser power feedback during 8 hours

⁴⁾ Gas A / Pre-mixed gas of CO₂:N₂:He (volume ratio, N₂ balance) 5:55:40% ±5% or less for each composition
Gas B / Pre-mixed gas of CO₂:N₂:He (volume ratio, Ne balance) 5:35:60% ±5% or less for each composition

Highly efficient start-up of your laser machines

Using the FANUC laser package, you have no additional work to establish communication between CNC and laser source. The laser control is directly integrated into the CNC's system - including all necessary laser control and diagnostic screens. This safe and efficient connection allows the easy integration of many useful laser processing functions:

Diagnostic functions

- screens for all relevant laser source data (internal pressure, discharge voltages, output power etc.)
- automatic calculation and display of laser power coefficient
- automatic leak check
- cutting data library

Processing parameter controls

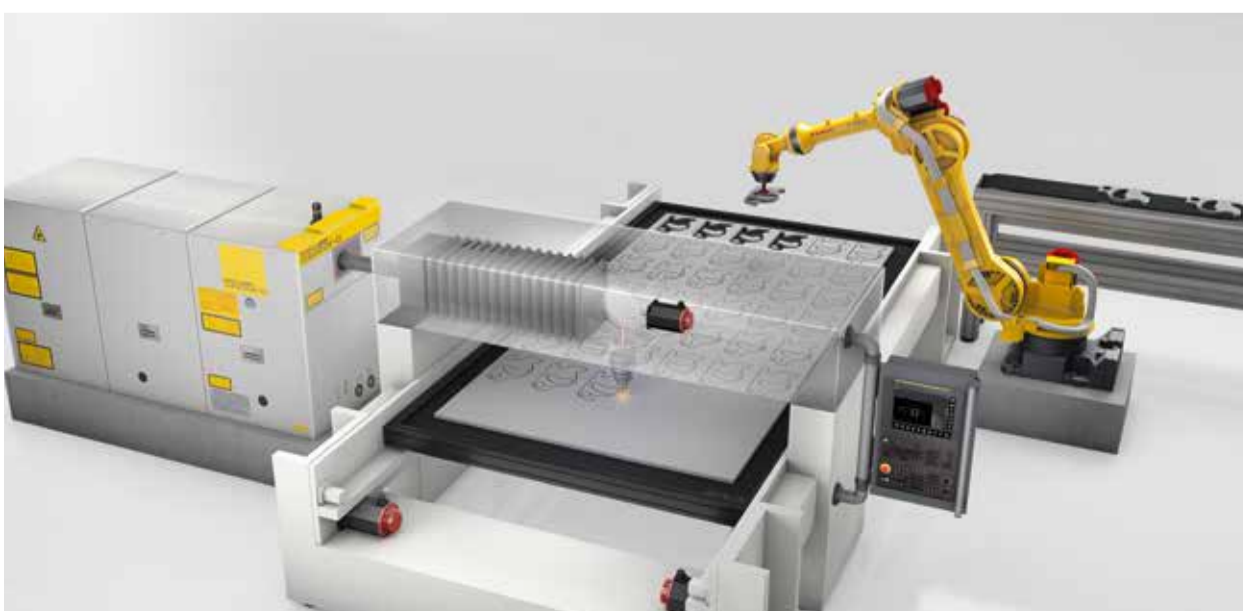
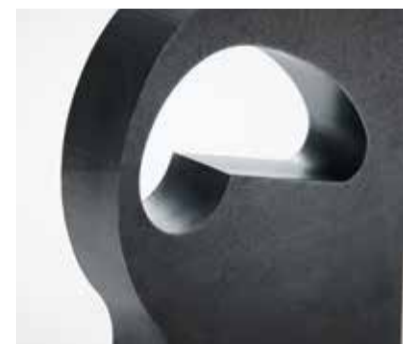
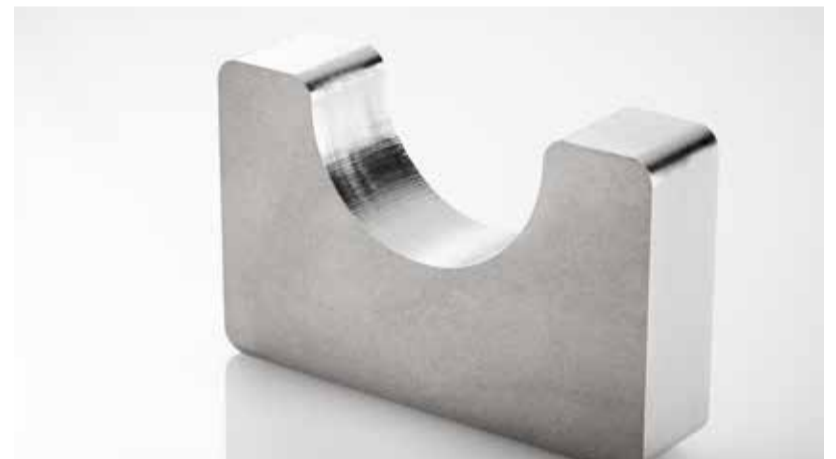
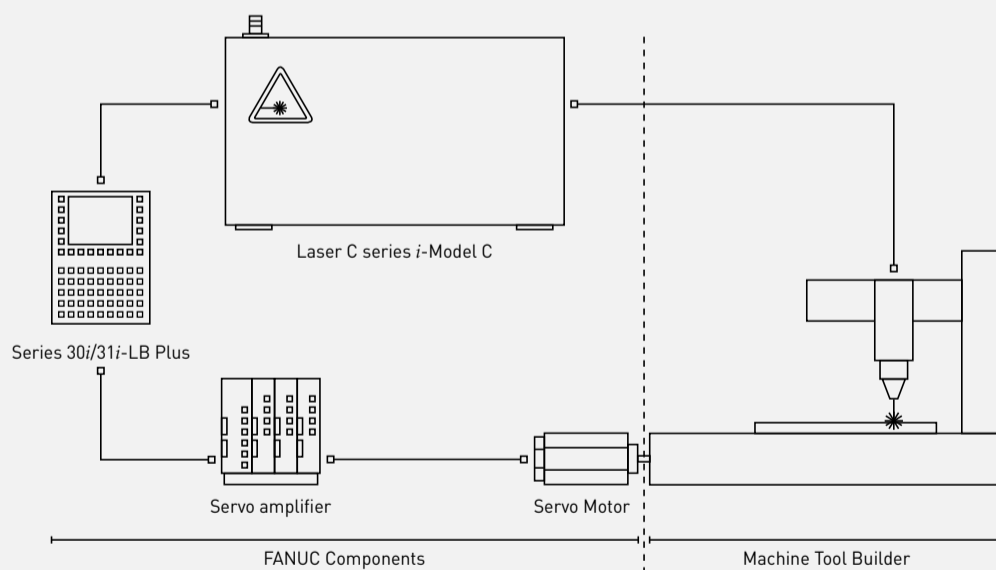
- laser power as a function of feedrate
- high speed laser cutting and piercing
- edge machining function to process sharp edges when cutting thick mild steel material
- total power control function to reduce thermal load when cutting thin material even at high speed
- direct control of assist gas

Special functions for efficient processing

- tracing axis control by means of an analogue input to connect gap sensor
- tracing function to keep the distance between cutting nozzle and workpiece surface constant
- sensor controlled piercing time
- CNC-beam length compensation to control an additional trombone axis by means of a servomotor
- retry function to enable unmanned machine operation



System Configuration



Customise your laser package!

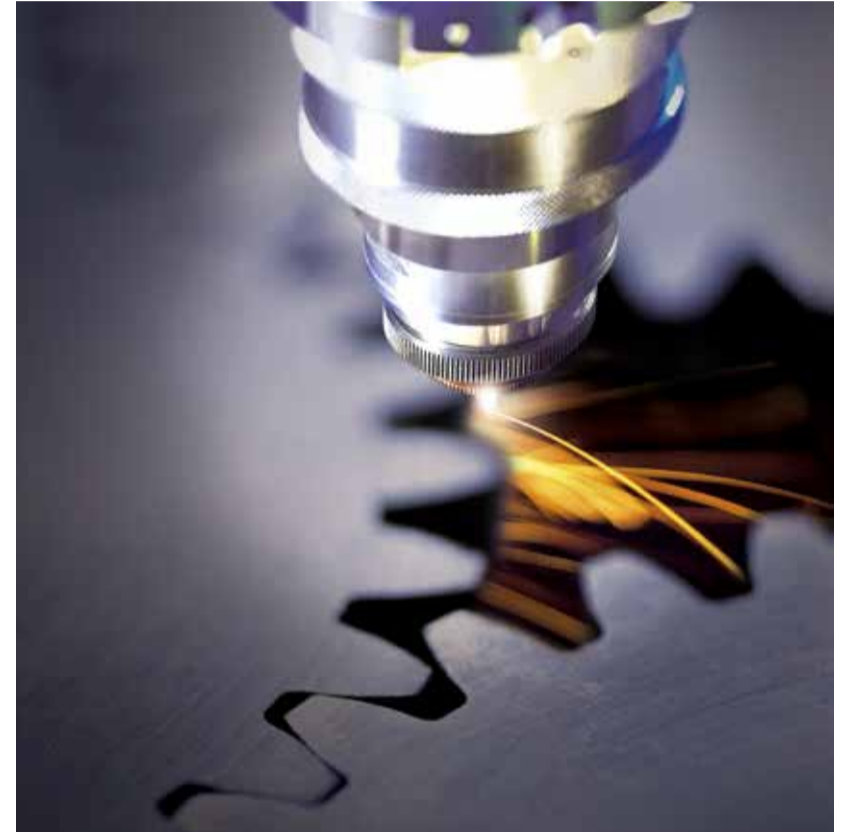
Choose and customise your laser dedicated multichannel CNC model FS30i-LB Plus for 2-D and 3-D laser cutting machines or cost optimised CNC model FS31i-LB Plus for standard 2-D laser cutting machines. Both CNC controls provide intelligent software solutions for effective and efficient laser processing and enable powerful laser/punch combination machines, enhancing the performance of your FANUC laser system in terms of cycle time, speed, accuracy and quality. The integrated laser control and diagnostic functions predict necessary maintenance to guarantee machine uptime and therefore high productivity. This will satisfy your customer.

Software functions for higher productivity:

- support of material handling in laser machines
- reduced laser power consumption
- support of stable laser cutting
- real time control of laser output power
- stabilisation of laser operation in severe environments
- integrated laser diagnostics
- diagnosis visualization with laser tool (PC tool)
- optimizable with SERVO GUIDE (PC tool)
- laser dashboard on latest iHMI CNC
- visualize power consumption of laser processing machine



	31i-LB Plus	30i-LB Plus
Max. controlled axes total / per path	26 / 12	32 / 24
Max. simultaneously controlled axes / path	4	24
Max. controlled paths	4	4
PMC function		
Max. number of I/O	DI 4096 / DO 4096	DI 4096 / DO 4096
Max. number of I/O-Link channels	3	3
Max. number of PMC channels	5	5
LASER 5-axis kit (option R105)	•	•
Smooth simultaneous 5-axis machining	-	•



Our strength: Service and Support

Intensive application support and personal customer service are major aspects of FANUC's world – from the first step to the last. A skilled and dedicated service team will help you to build and operate the most efficient machines. Always flexible, always fast, always near. And with special FANUC Service packages and intensive training programs with our skilled laser field engineers, you can improve the performance of your machines.



Wherever you need us: we are there

With the largest global network of local subsidiaries in all continents, we are always there to meet your needs. Fast and efficient – 24/7. So you always have a local contact that speaks your language.

One common servo and control platform – Infinite opportunities **THAT'S FANUC!**



FA

CNCs,
Servo Motors
and Lasers

ROBOTS

Industrial Robots,
Accessories
and Software

ROBOCUT

CNC Wire-Cut
Electric Discharge
Machines

ROBODRILL

Compact
CNC Machining
Centres

ROBOSHOT

Electric CNC
Injection Moulding
Machines

IoT

Industry 4.0
solutions